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American
Dental
Association

211 East Chicago Avenue
Chicago, Illinois 60611-2678

Dental Practice and Economic Trends 1985 - 1990

Dental Practice and Economic Trends
1985 - 1990

selected data from the
Quarterly Survey of Dental Practice

American Dental Association
Bureau of Economic and Behavioral Research
October 1991

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Dental Practice and Economic Trends, 1985-1990

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Introduction, Interpreting the Charts, and Methodology

Introduction

The data presented in this report was gathered by the American Dental Association's Quarterly Survey of Dental Practice (QSDP). Since 1983 the Bureau of Economic and Behavioral Research (BEBR) has collected data on a quarterly basis from a panel of private practitioners composed of approximately 2 percent of the nation's private practicing dentists. The QSDP is the American Dental Association's primary means of collecting current information on the economics of the private practice of dentistry. It provides a historical database that can be used to examine dental economics in retrospect and, using time-series analysis techniques, can also be used to forecast future activity.

Members remain on the panel for up to two years and receive a comprehensive questionnaire every three months. Mailings are made monthly, and panel membership is staggered so that each month about 900 dentists receive the questionnaire. During the 1985-1990 period, the monthly adjusted response rate averaged 48 percent. BEBR wishes to take this opportunity to express our thanks to the panel members. Without their dependable participation, this project simply could not be conducted.

Dental Practice and Economic Trends, 1985-1990 is an expanded update to an earlier report prepared in 1986 by RRC, Inc. of Bryan, Texas as an economic briefing for the American Dental Association's Board of Trustees. The 1986 report used quarterly data and covered the period of March 1983 to March 1986. This report uses monthly data and, in addition to dental economics, presents information on dentistry as part of the national health care industry, the business cycle, and selected national economic indicators.

The information in this report is based on data reported by general practitioners only. Indicators of dental economics presented here include patient visits, emergency visits, patient no-shows, new patients, referrals from other dentists, monthly fees charged, salary and wages paid to dental assistants and hygienists, and expenditures for dental supplies and dental laboratory services. The STATA statistical package was used for database creation, manipulation, and exploratory analysis. The US Census Bureau's X11-2 decomposition software was used to deseasonalize the data and identify trend-cycle components.

This report presents historical information about dental economics and does not forecast future trends in dentistry. Readers should keep in mind, however, that a national economic recession officially began in July 1990.

Interpreting the Charts

For most dental practice indicators, three charts are shown accompanied by a short narrative. The first chart presents the raw data reported by Quarterly Survey of Dental Practice panel members. The values shown are averages based on monthly responses from about three hundred and fifty general practitioners across the US. Dentists who want to compare the past activity of their own practice with that of a hypothetical "average" practice should use this chart, keeping in mind that the data are national averages.

The second chart shows the monthly averages after the data have been deseasonalized, that is, after the effects of seasonal factors have been removed. Many economic activities and much consumer behavior is influenced by the quarter and month of the year and the number of working days in the month. These three factors combine to create seasonality, which can be described as a periodic change that more or less repeats itself at about the same time during a year. Retail sales, for instance, normally peak in December when families shop for Christmas presents. In the annual budget for staffing and inventory, therefore, retailers must include the effect of the "Christmas season".

Certain aspects of the practice of dentistry are affected by seasonality as well, sometimes indirectly, Certain times of the year are busier than others, since patient visits are seasonal. This, in turn, contributes to making total fees charged seasonal as well. To get a truer picture of dentistry as an economic activity, therefore, we must consider seasonality and account for its effect on patient behavior.

Dentists may incorporate seasonality into their practice planning without recognizing it as such. Vacations, as one example, are scheduled during periods when the number of patient visits is comparatively low. Further, knowing the effects of seasonality can help a dentist recognize if a change in a practice indicator such as patient visits might be permanent or only temporary. The second chart, then, shows what the raw data would look like if there was no seasonal influence. Some dental practice indicators, however, are not affected by seasonality, so this chart may not be present.

The third chart shows how the data look when only the long-term trend and cyclic factors are considered. The effects of both seasonality and "chance" have been removed. In this chart, the practice indicator is affected only by long-lasting, evolutionary factors such as population growth, economic growth or contraction, technological improvement, and gradual change in consumer needs and habits. These charts provide a clear historical perspective of the economics of dentistry over the past five years.

Methodology

The raw data was generated by the Quarterly Survey of Dental Practice during the period January 1985 through December 1990. Although collected on a quarterly basis, the manner in which the survey is administered to the panel of participants allows the data to be broken down into separate data sets for each month.

Data Collection

The panel is randomly selected so as to represent the nation's private practicing dentists. *Membership in the American Dental Association is not a factor in selection.* Dentists remain on the panel for up to two years and receive a survey questionnaire every three months. If a dentist is removed from the panel before the end of two years, e.g., because of leaving private practice, they are replaced with another randomly selected dentist so that the panel size remains constant and representative.

Approximately 900 private practicing dentists receive a questionnaire each month. About three-quarters of the questionnaire remains the same throughout the year, and the other one-quarter is topical, having the option of being changed each quarter.

- Two weeks prior to initial mailing, panel members are sent a personalized introductory letter alerting them that they will be receiving the questionnaire soon. The letter is tailored to the dentist's status on the panel. Separate letters are sent to those dentists new to the panel, dentists continuing on the panel, and dentists receiving their final questionnaire.

- The initial mailing is accompanied by a personalized letter that describes the purpose of the project and emphasizes the importance of the dentist's on-going participation.

- Three weeks after the initial mailing telephone contact is attempted with those participants who have not responded. A second copy of the questionnaire is mailed if the panel member requests one. The coverletter is not personalized.

- Two weeks after the telephone followup, a second mailing is made to all nonrespondents. Three different personalized coverletters are used: nonrespondents who were sent another questionnaire during the telephone followup; nonrespondents who agreed during the telephone followup to reply and did not; and nonrespondents who were not contacted during the telephone followup (a telephone number was not available, for example).

- Data collection is cut-off twelve weeks after the initial mailing. At this time a "thank-you" letter is mailed to respondents who have been on the panel for one year. The letter is accompanied by an informational stuffer. Material sent out in the past includes pamphlets with information on patient education and American Dental Association-sponsored insurance programs.

Data Analysis

STATA was used to prepare the data and perform exploratory analysis. A monthly data set was first constructed consisting only of general practitioners. For each variable in each monthly data set, descriptive statistics and one-way frequencies were produced. For most variables, each month had a few extremely high values that could significantly skew the data. To correct for extreme values, any value greater than the mean plus three standard deviations was set to missing. Monthly descriptive statistics were recalculated using the modified data set, and the modified data sets were then combined into a single data set for analysis.

Each variable was checked for the presence of seasonality by examining its autocorrelation coefficients for a twelve month period. Salaries paid to dental hygienists and chairside assistants, walk-in visits, no-show visits,and the percentage of new patients who are referrals from other dentists were found to be non-seasonal. In addition to these, the decomposition software also identified emergency visits, and expenditures for dental supplies and laboratory services as being non-seasonal.

The US Bureau of the Census' X-11.2 variant of the Census Method II Seasonal Adjustment Program[1] was used to decompose the data into trading day, seasonal, trend-cycle, and irregular components. The program incorporates an option that makes trading day and holiday adjustments only when F-tests indicate that they explain a statistically significant portion of the variation in the time-series. The program was repeatedly on each variable until the most accurate adjustment was found. The curve used to compute the final seasonal factors was changed in each run, as was the length of the moving average used to estimate the trend-cycle. Selection of the most accurate adjustment was based on seven diagnostic tests and an overall quality control measure produced by the program for each run.

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[1]For details, see US Department of Commerce, Bureau of the Census, Technical Paper Number 15, "The X-11 Variant of the Census Method II Seasonal Adjustment Program," revised February 1967, and "Supplement to Census Technical Paper Number 15," January 6, 1989.

Dentistry and the Health Care Industry

Dentistry and the Health Care Industry

This section presents an overview of readily available data from a variety of sources. In most cases, 1989 is the most recent year for which information is available.

Employment in the health industry, 1989:	
Entire industry[1]	7,635,000
Number of physicians[2]	600,789
Number of dentists[3]	
Professionally active	**139,875**
Private practitioners	**126,970**
Expenditures in 1989 (billion dollars):[4]	
All personal health care	$530.7
Hospital care	232.8
Physician services	117.6
Dental services	**31.4**
Percent growth in average annual expenditures, 1985-1989:[5]	
All personal health care	9.7 %
Hospital care	8.5
Physician services	12.3
Dental services	**7.8**
Percent share of 1989 gross national product:[4]	
All personal health care	10.0 %
Hospital care	4.4
Physician services	2.2
Dental services	**.6**
Expenditures per capita in 1989:[6]	
All personal health care	$2,138
Hospital care	937
Physician services	474
Dental services	**127**
Percent growth in expenditures per capita, 1985-1989:[5]	
All personal health care	27.2 %
Hospital care	24.1
Physician services	33.8
Dental services	**21.9**

Percent increase in inflation, 1985-1990[7]	
Consumer price index (urban consumers)	25.7 %
CPI - medical care	52.4
CPI - hospital rooms	60.9
CPI - physician services	50.2
CPI - dental services	**44.9**
Percent of US population with some type of health insurance, 1989:[8]	87.0 %
Percent of full-time employees in firms with more than 100 employees that have health insurance plans, 1988:[9]	90 %
Hospital/surgical	88
Dental	**60**
Percent of US population with private dental insurance, 1984[10]	47 %

Sources:

1 Plunkert, Lois M., "The 1980s: A Decade of Job Growth and industry Shifts." Monthly Labor Review 113 (September 1990) 3-15.

2 American Medical Association. Unpublished estimate, August 1991.

3 ADA, "Forecasts of the Supply of Dentists." 1989 Annual Report page 71, Table 4.

4 Lazenby, Helen C. and Suzanne W. Letsch, "National Health Expenditures, 1989." Health Care Financing Review 12 (Winter 1990): 1-25.

5 Calculated using data from source 4.

6 Calculated using data from source 4 and US Bureau of the Census, Population Estimates and Projections. Series P-25: "Projections of the Population of States by Age, Sex, and Race: 1989" Number 1057, January 1990.

7 US Bureau of Labor Statistics, CPI Detailed Report various issues 1985-1991.

8 Health Insurance Association of America, Unpublished estimate, August 1991.

9 US Bureau of the Census, "Employee Benefits in Medium and Large Firms." 1990 Statistical Abstract of the US Table 679, page 414.

10 National Institute of Health, Oral Health of United States Adults: National Findings August 1987, p. 6.

The Business Cycle

The Business Cycle

Business cycles are recurrent but nonperiodic fluctuations in general business and economic activity that take place over a period of years. The business cycle is composed of four phases: prosperity, recession, depression, and recovery. These phases have only general characteristics that all economists agree on. Most economists do agree, however, that business cycles are the result of the interaction of changes in consumption and investment expenditures.

The phases are not necessarily equal in scope or intensity and do not necessarily happen in the order listed. An economy can fluctuate for years between expansion and contraction without experiencing either high prosperity, deep recession, or depression. Further, the transition from one phase to another is often almost imperceptible, with the new phase not being recognized until it is well underway. Since WWII, the cycle has been prosperity, recession, recovery.

This report covers the January 1985 to December 1990 period. Until July 1990, the national economy was in a period of prosperity during which the employment, capital investment, and consumption rates were all comparatively high and growing. In July 1990, the economy entered a recessionary period where gross national product either declines or remains stagnant, unemployment is comparatively high, and capital investment and consumption measures decline from previously high levels. As of September 1991, economists disagree as to whether the recovery phase has begun. Recovery is characterized by rising business output, employment, and income, along with an expanding rate of capital investment and consumption following a recession.

Four measures of economic activity are presented: gross national product (GNP) and the indexes of leading, coincident, and lagging indicators. While there is no single best measure of national economic activity, these measures are widely accepted, easily understood, incorporate the most scientific measurements possible, and are proven reliable for forecasting future activity.

The most comprehensive measure of the nation's economic activity is the gross national product. It is always stated in money terms and represents the total final market value of all goods and services produced during a year. The major drawback with gross national product and all other value-based measures is inflation, which artificially increases market value. Inflation, however, can be compensated for by stating the measure in terms of constant dollars (also called real or deflated dollars).

The index of leading indicators is a composite of eleven economic measures whose changes precede changes in national economic activity. These measures are:

- average weekly hours of production or nonsupervisory manufacturing workers;
- average weekly initial claims for state unemployment insurance;
- consumer goods and materials manufacturers' new orders, in 1982 dollars;
- vendor performance/slower deliveries diffusion index;
- contracts and orders for plant and equipment, in 1982 dollars;
- new private housing units authorized by local building permits;
- change in durable goods manufacturers' unfilled orders, in 1982 dollars;
- percent change in sensitive materials prices;
- index of 500 common stock prices;
- money supply, M2, in 1982 dollars; and
- the University of Michigan consumer expectations index.

The index of coincident indicators is a composite of four economic measures which move "in phase" with the aggregate national economy and therefore measure current activity. They are:

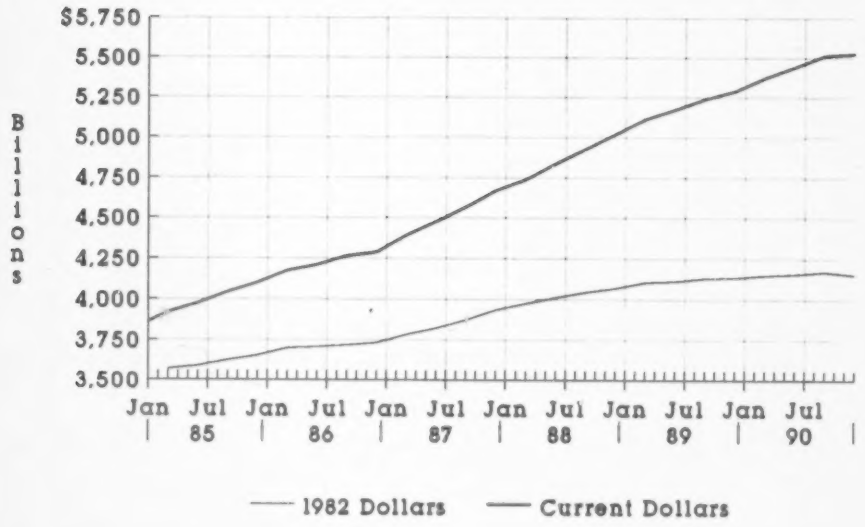
- employees on nonagricultural payrolls;
- personal income less transfer payments, in 1982 dollars;
- the industrial production index; and
- manufacturing and trade sales, in 1982 dollars.

The index of lagging indicators is a composite of seven economic measures which trail behind changes in national economic activity. These are:

- average duration of unemployment, in weeks;
- ratio of manufacturing and trade inventories to sales, in 1982 dollars;
- percent change in the index of labor cost per unit of output in manufacturing industries;
- average prime rate charged by banks;
- Commercial and industrial loans outstanding, in 1982 dollars;
- ratio of consumer installment credit outstanding to personal income; and
- percent change in the consumer price index for services.

The following tables show the business cycle between January 1985 and December 1990. The measures used the gross national product, and the indexes of leading, coincident, and lagging indicators. Keep in mind that gross national product is a value-based measure and constant 1982 dollars provide a correction for inflation.

Gross National Product



Source: US Dept. of Commerce
Business Conditions Digest &
Survey of Current Business

Index of Leading Economic Indicators

Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Index of Coincident Economic Indicators

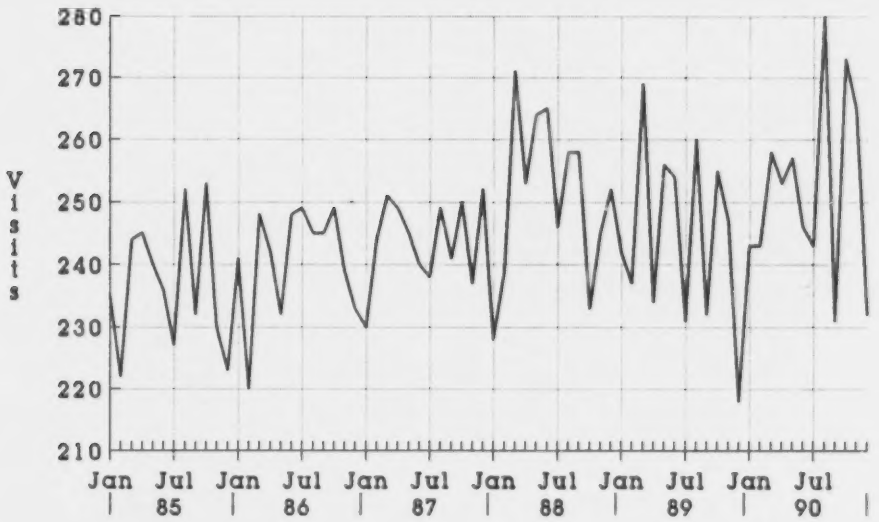
Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Index of Lagging Economic Indicators

Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Dental Practice Indicators

Average Monthly Scheduled Patient Visits Including Hygienist Visits



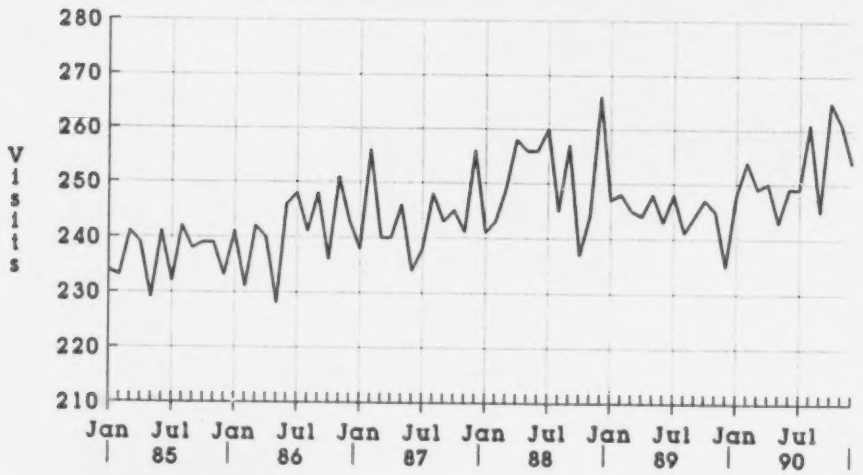
Source: ADA, Quarterly Survey of Dental Practice

Seasonality: December and January wintertime lows then April to June highs. On average, there are large increases in February and August. May and August are busiest for total patient visits including hygienist visits.

Trend: Slow upward movement.

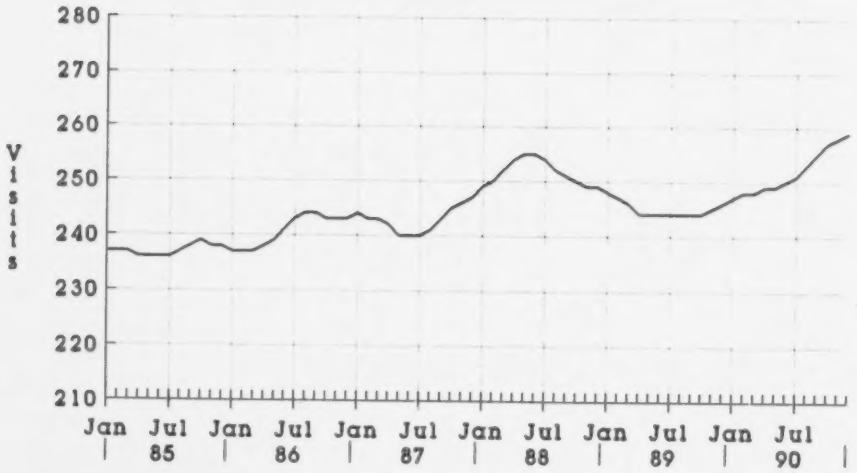
Cycle: No clear pattern.

Average Monthly Scheduled Patient Visits Including Hygienist Visits (Seasonally Adjusted)



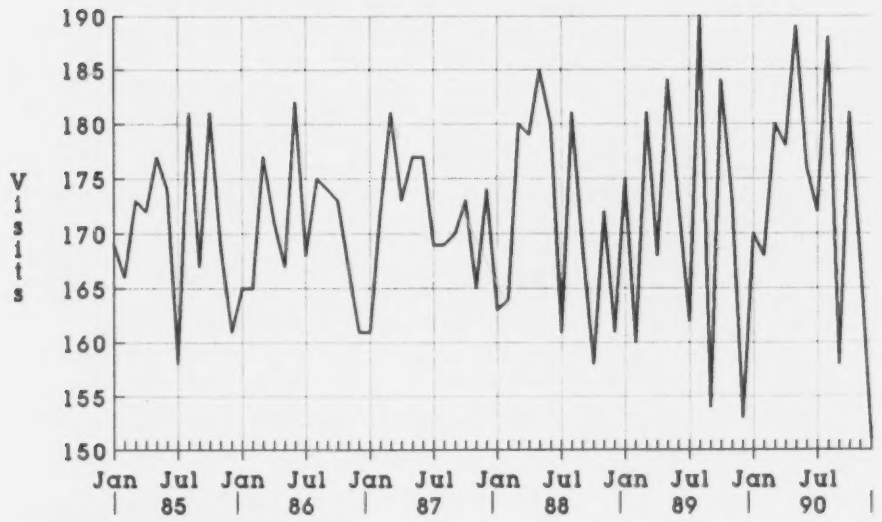
Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Scheduled Patient Visits Including Hygienist Visits (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Scheduled Patient Visits Not Including Hygienist Visits



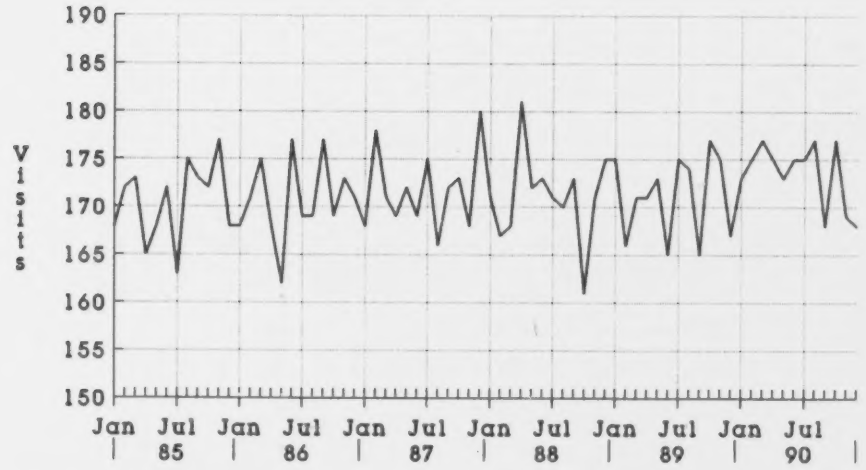
Source: ADA, Quarterly Survey of Dental Practice

Seasonality: Winter lows and spring highs. Generally, May and August are the busiest months for visits to the dentist only, closely followed by June. July and December are slowest.

Trend: Very stable with virturally no growth.

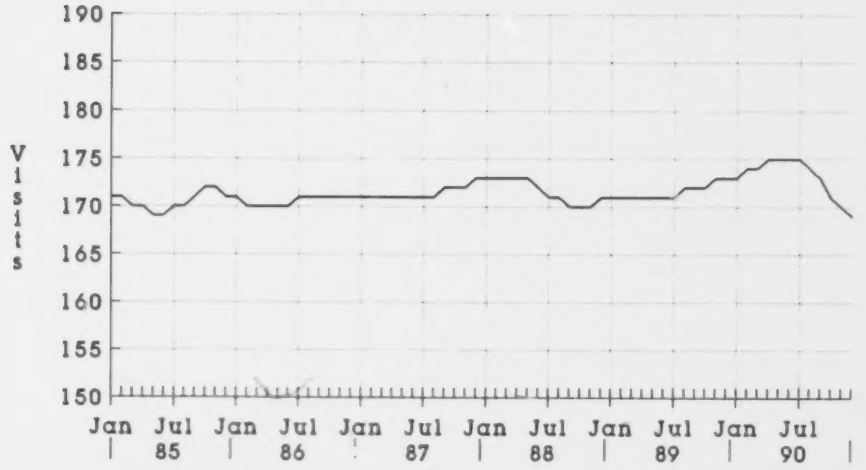
Cycle: With the exception of the decline beginning in July 1990, does not appear to be affected by economic growth.

Average Monthly Scheduled Patient Visits Not Including Hygienist Visits (Seasonally Adjusted)



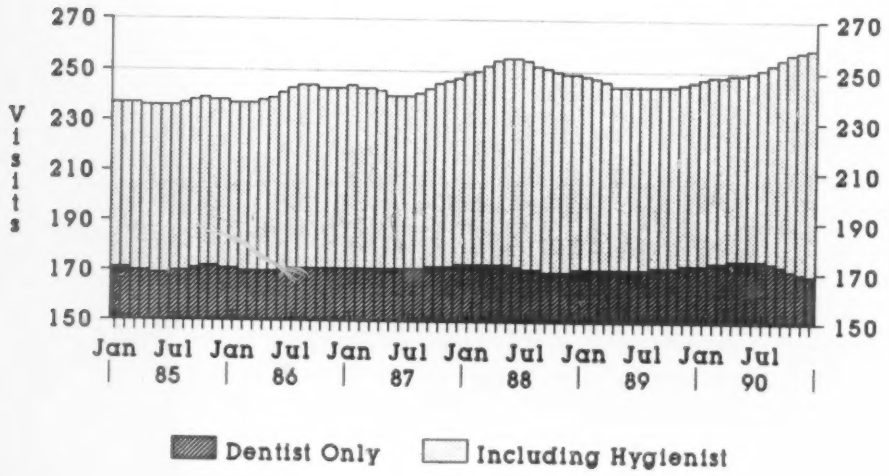
Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Patient Visits, Not Including Hygienist Visits (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Scheduled Patient Visits
Dentist Visits + Hygienist Visits
(Based on Trend-Cycle Components)

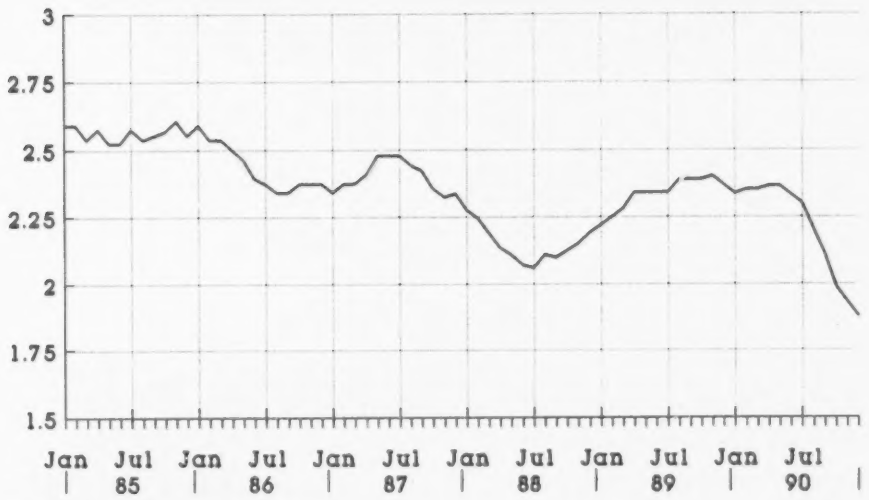


Source: ADA, Quarterly Survey of Dental Practice

Comments: Patient visits vary both seasonally and monthly. Visits to the dentist only appear to be more responsive to national economic contraction than are hygienist visits. Visits to the hygienist provide the growth factor in total patient visits.

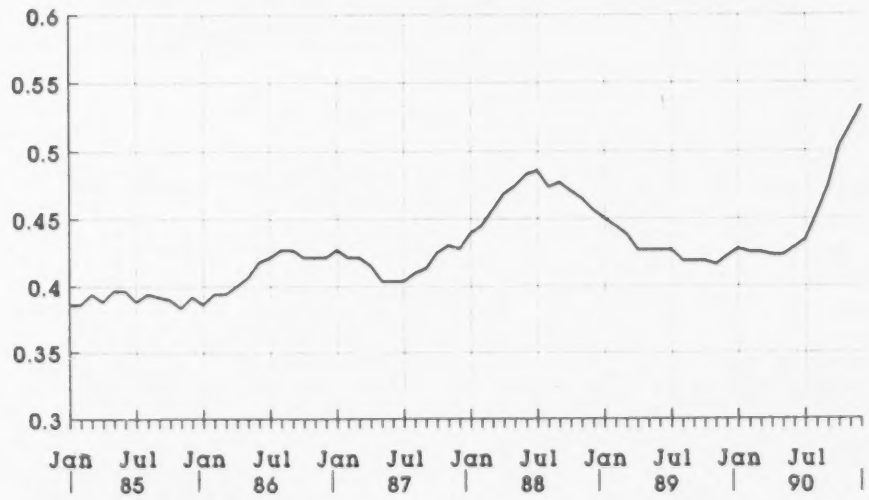
The data for the July to December 1990 recessionary period suggest that patients were continuing their preventive treatments--prophylaxis--but may have been postponing other, more elective dental procedures.

Average Monthly Scheduled Patient Visits
Ratio of Dentist to Hygienist Visits
(Based on Trend-Cycle Components)



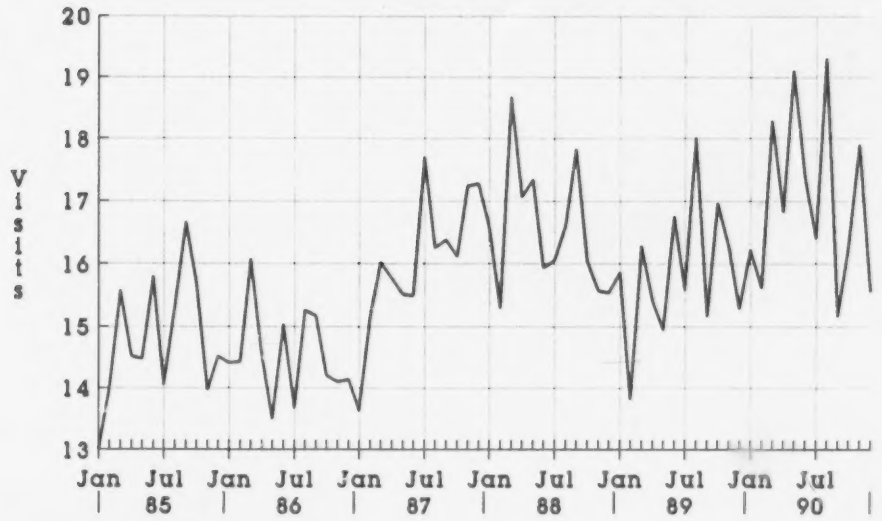
Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Scheduled Patient Visits
Ratio of Hygienist to Dentist Visits
(Based on Trend-Cycle Components)



Source: ADA, Quarterly Survey of Dental Practice

Average Number of Emergency Visits Treated Per Month



Source: ADA. Quarterly Survey of Dental Practice

Seasonality: Emergency visits are not seasonal, but do vary greatly month-to-month. Generally declines from October to February and then spikes in March.

Trend: Slowly rising.

Cycle: Does not respond to the business cycle.

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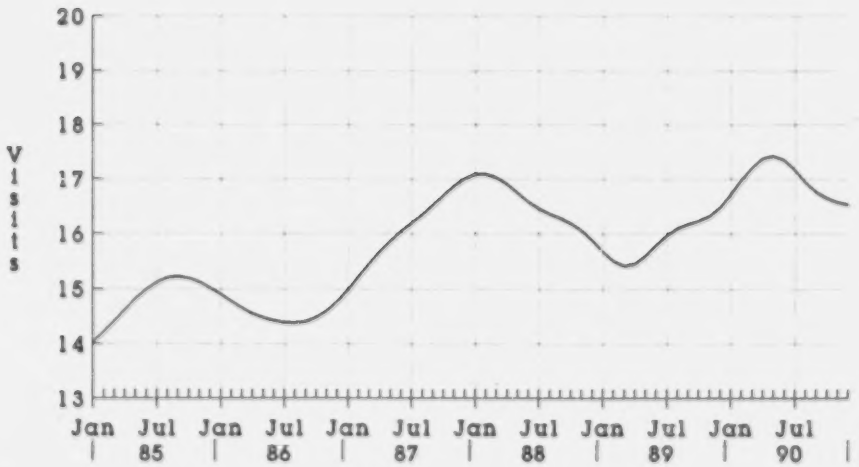
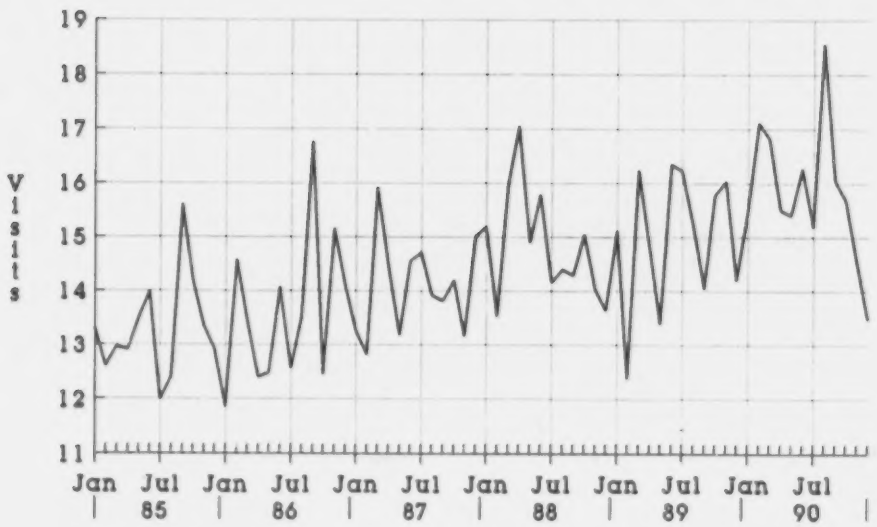
The Average Number of Emergency Visits Treated Per Month Does Not Vary Seasonally

Average Number of Emergency Visits Treated Per Month (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Number of Patient No Shows Per Month



Source: ADA, Quarterly Survey of Dental Practice

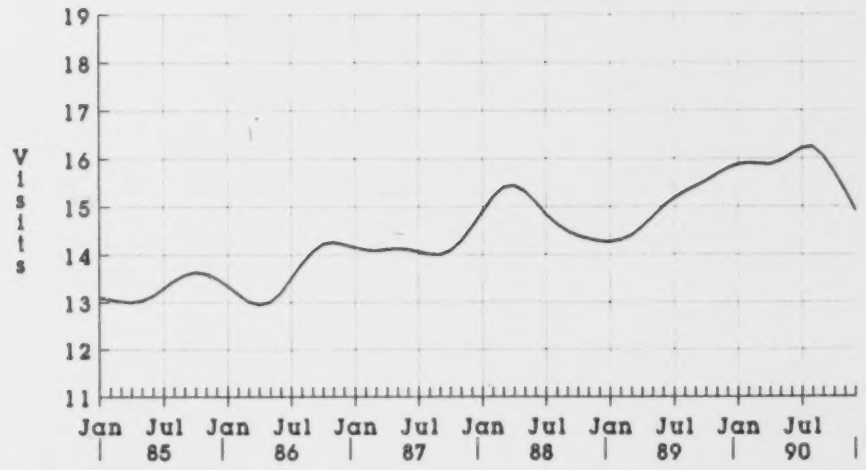
Seasonality: Patient no shows are not seasonal. In general, June, September, and March have the highest number of no shows; February and May have the fewest.

Trend: Slowly rising.

Cycle: Although no clear pattern is evident, the steep drop-off beginning in August 1990 appears to indicate that the number of no-shows decreases during recessionary periods.

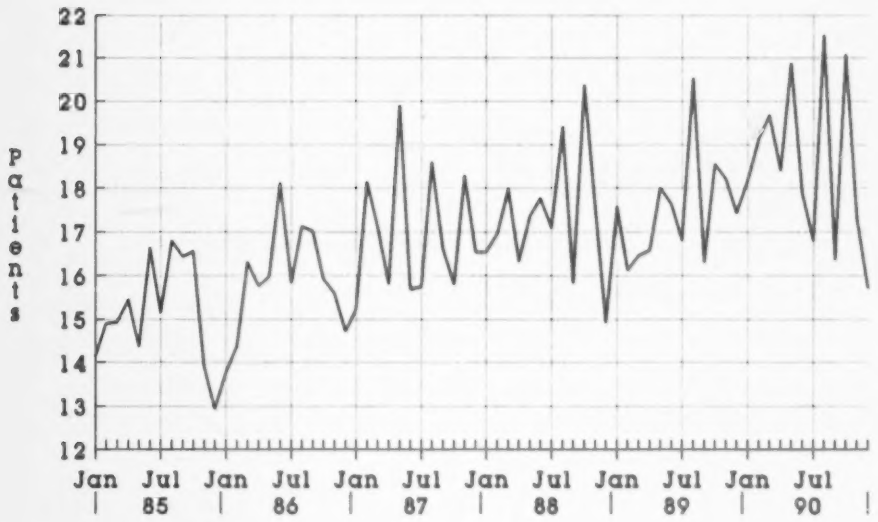
The Average Number of Patient No Shows Per Month Does Not Vary Seasonally

Average Number of Patient No Shows Per Month (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Number of New Patients Seen Per Month



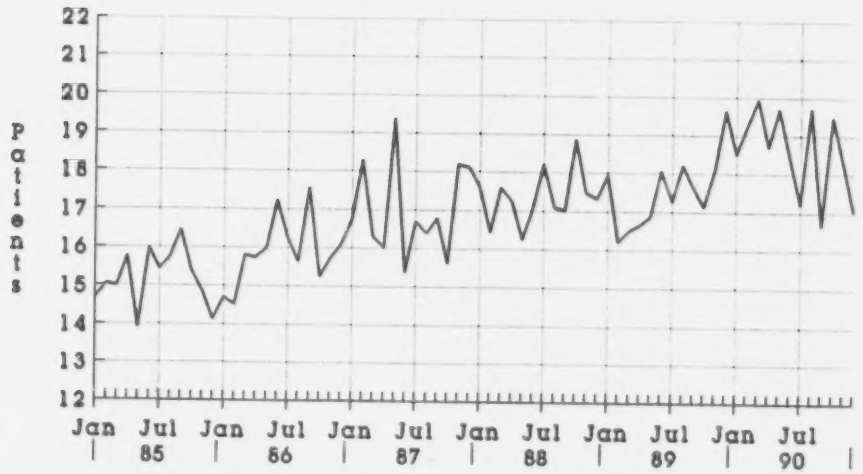
Source: ADA, Quarterly Survey of Dental Practice

Seasonality: The summer months have the highest number of new patients and spring has the fewest. August is on average the busiest month.

Trend: Slowly rising.

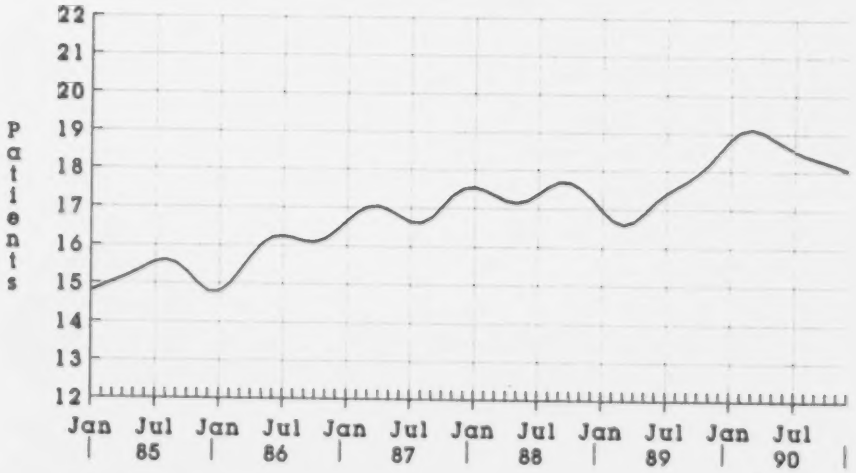
Cycle: Appears to follow the business cycle. Could be a leading indicator of national economic health.

Average Number of New Patients Seen Per Month (Seasonally Adjusted)



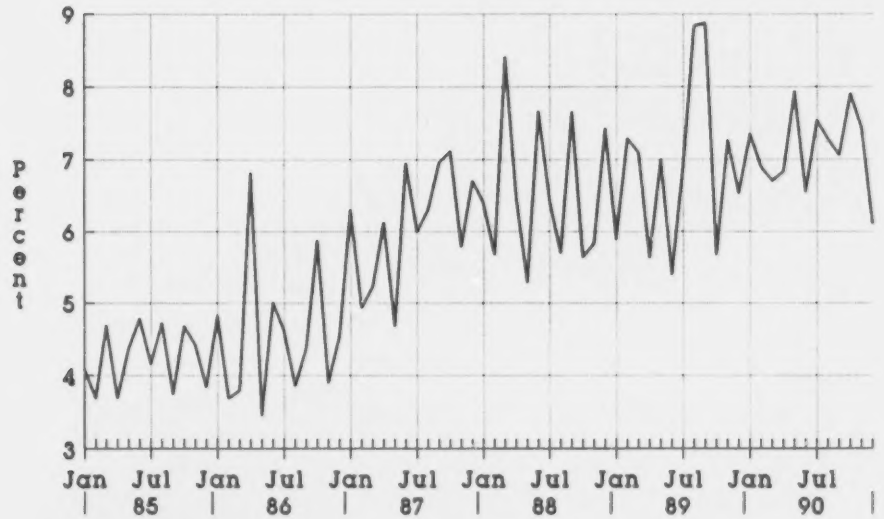
Source: ADA, Quarterly Survey of Dental Practice

Average Number of New Patients Seen Per Month (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Percentage of New Patients Who Are Referrals From Other Dentists



Source: ADA, Quarterly Survey of Dental Practice

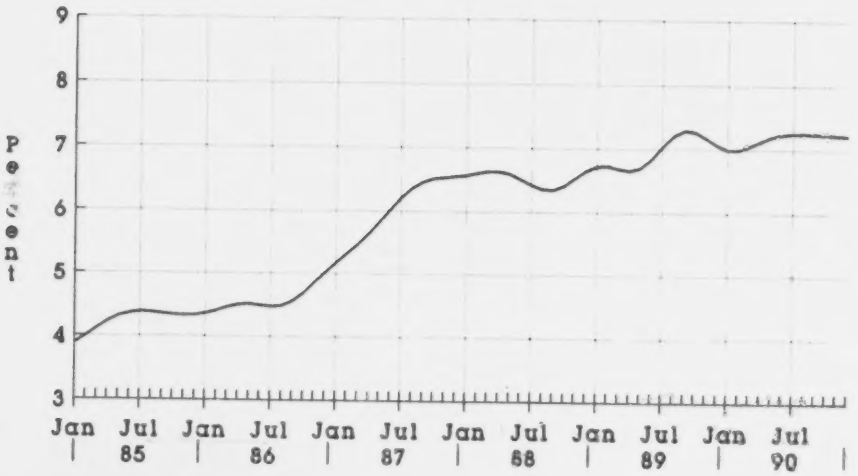
Seasonality: The percentage of new patients who are referrals from another dentist is not affected by seasonality and varys only slightly month-to-month.

Trend: Increasing slowly, except for a sharp increase between August 1986 and August 1987.

Cycle: No clear cyclic pattern.

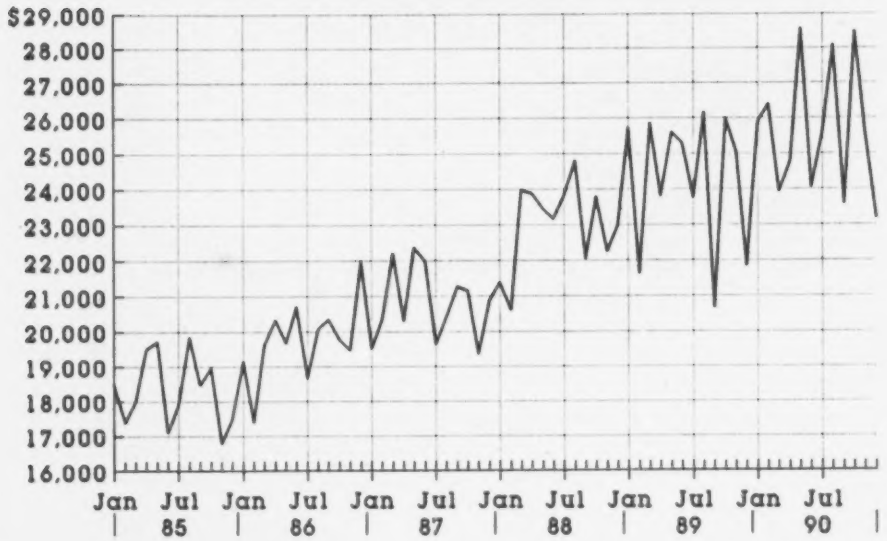
The Average Percentage of New Patients Who Are Referrals From Other Dentists Does Not Vary Seasonally

Average Percentage of New Patients Who Are Referrals From Other Dentists (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Total Monthly Fees Charged, Including Hygienist Fees



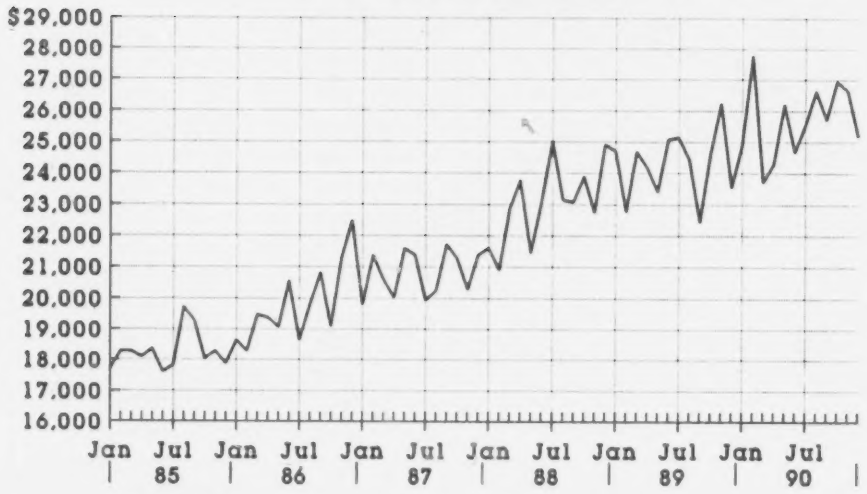
Source: ADA, Quarterly Survey of Dental Practice

Seasonality: Total monthly fees charged, including hygienist fees, shows very little seasonal variation. May and April average the largest amount of monthly total fees charged, and November averages the smallest amount.

Trend: Upward. Beginning in October 1987, strongly upward.

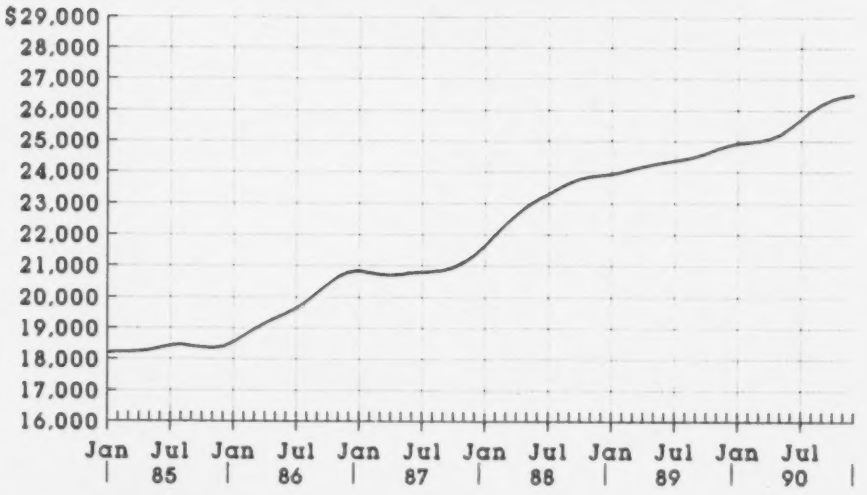
Cycle: Appears to follow the business cycle, but no effect of the recession that began in July 1990 is shown yet.

Average Total Monthly Fees Charged, Including Hygienist Fees (Seasonally Adjusted)



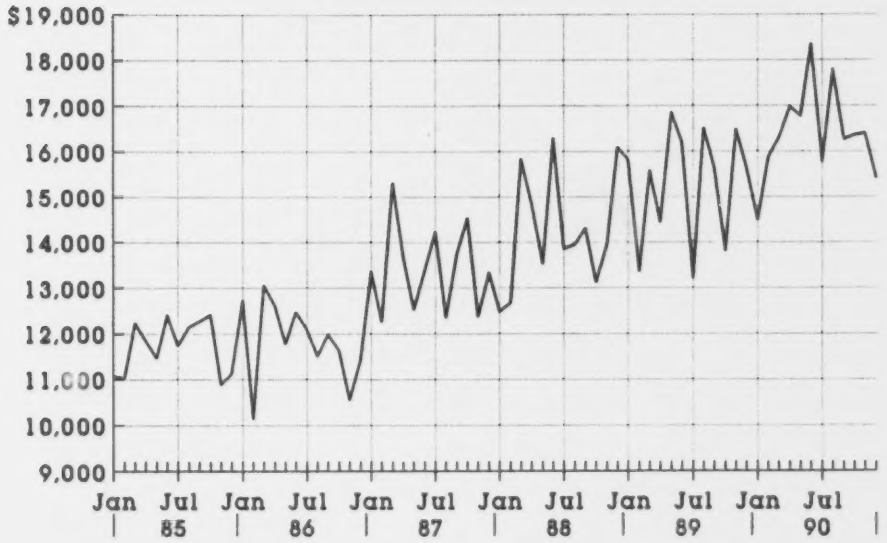
Source: ADA, Quarterly Survey of Dental Practice

Average Total Monthly Fees Charged, Including Hygienist Fees (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Total Monthly Fees Charged, Not Including Hygienist Fees



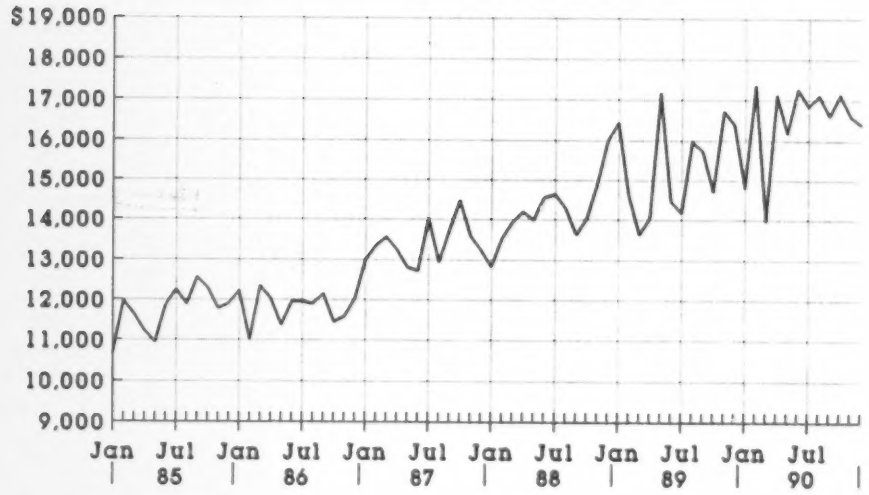
Source: ADA, Quarterly Survey of Dental Practice

Seasonality: Total monthly fees charged by the dentist only have very little, if any, seasonal variation. On average, June shows the largest amount, closely followed by March. February averages the smallest amount of dentist fees charged by the dentist only.

Trend: Steady upward movement, but in conjunction with periods of no growth or slight decline.

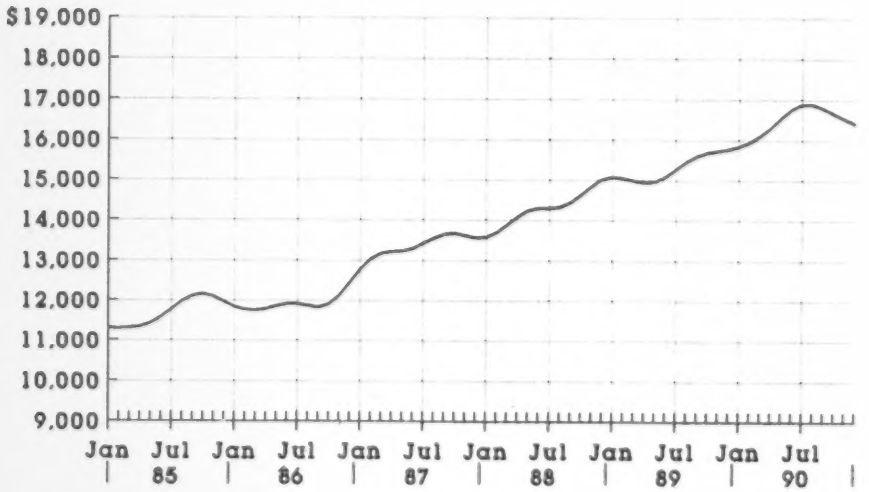
Cycle: Follows the business cycle closest as a coincident indicator.

Average Total Monthly Fees Charged, Not Including Hygienist Fees (Seasonally Adjusted)



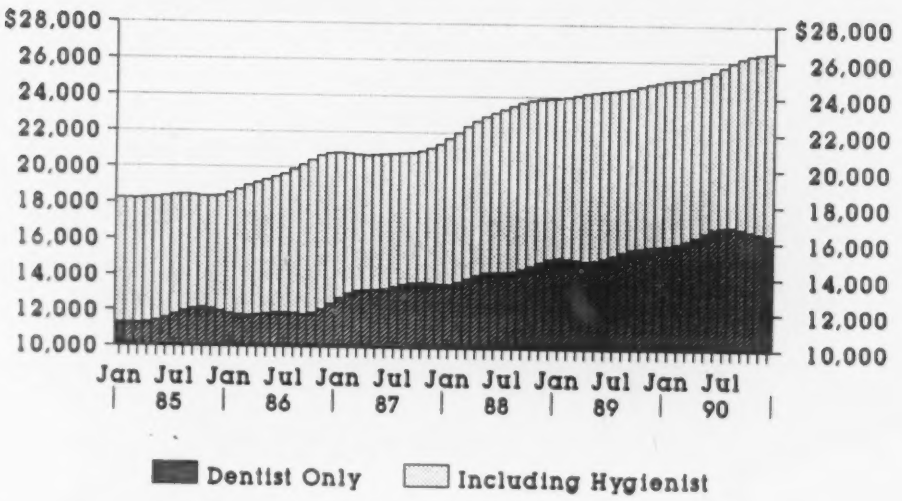
Source: ADA, Quarterly Survey of Dental Practice

Average Total Monthly Fees Charged, Not Including Hygienist Fees (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Fees Charged: Dentist Fees + Hygienist Fees (Based on Trend-Cycle Components)

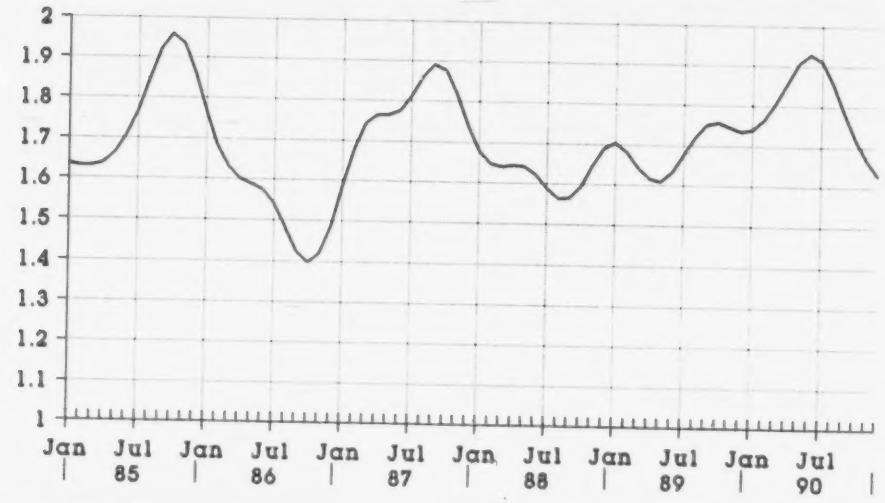


Source: ADA, Quarterly Survey of Dental Practice

Comments: The upward trend in fees charged is probably inflation driven, since visits treated by the dentist only have remained stable and total visits including hygienist visits have grown only about ten percent during the entire period.

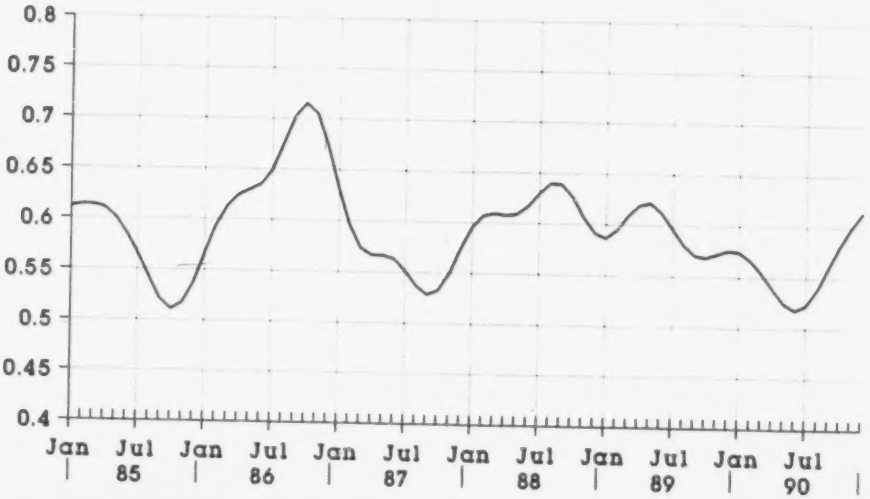
Hygienist fees account for a substantial portion of total fees charged and provide growth even during periods when dentist fees charged are not increasing or even declining.

Average Monthly Fees Charged: Ratio of Dentist to Hygienist Fees (Based on Trend-Cycle Components)



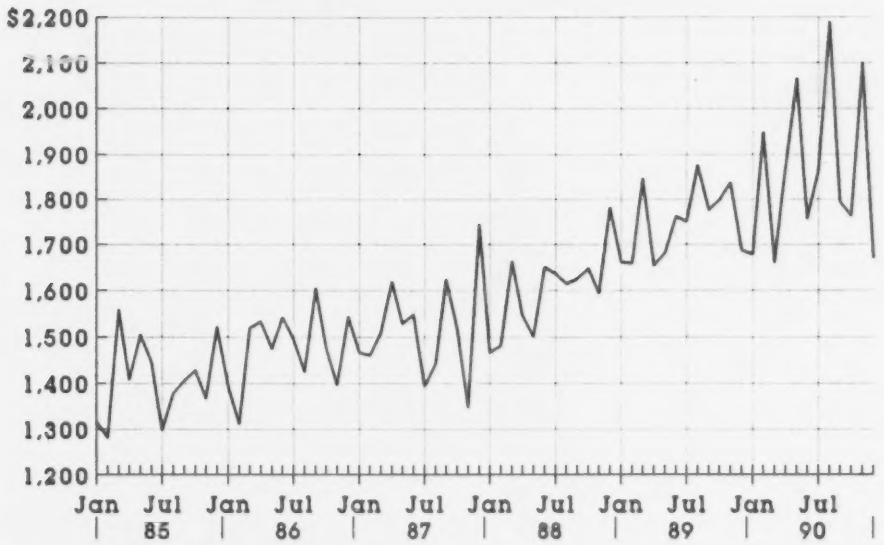
Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Fees Charged: Ratio of Hygienist to Dentist Fees (Based on Trend-Cycle Components)



Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Salary and Wages Paid to Dental Assistants



Source: ADA, Quarterly Survey of Dental Practice

Seasonality: Dental assistant salary and wages are not seasonal, and there is very little month-to-month variation. On average, however, salary and wages are slightly higher in December and slightly lower in January.

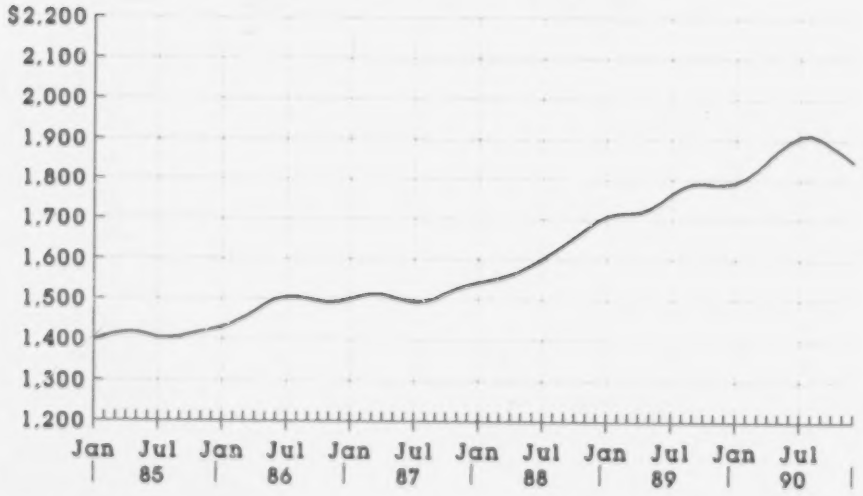
Trend: Increasing, especially since October 1987.

Cycle: Follows the general business cycle.

Comments: Dental assistant salary and wages have a moderately strong relationship with fees charged by the dentist only. As such, growth is probably inflation-driven. The drop-off beginning in July 1990 also mirrors the drop-off in dentist only visits, but there is only a weak relationship between the two.

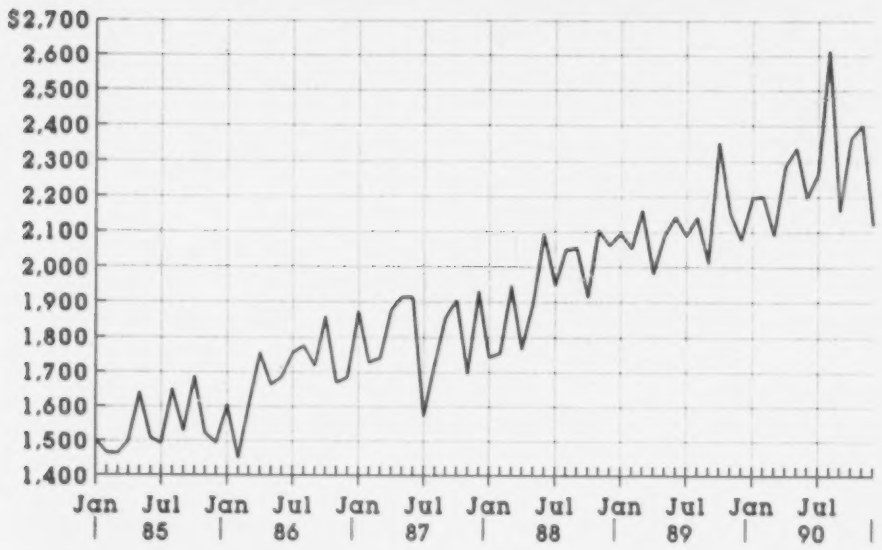
The Average Monthly Salary and Wages Paid to Dental Assistants Does Not Vary Seasonally

Average Monthly Salary and Wages Paid to Dental Assistants (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Salary and Wages Paid to Dental Hygienists



Source: ADA. Quarterly Survey of Dental Practice

Seasonality: Dental hygienist salary and wages do not vary seasonally. Salary and wages are on average slightly higher in August and May and lowest in December.

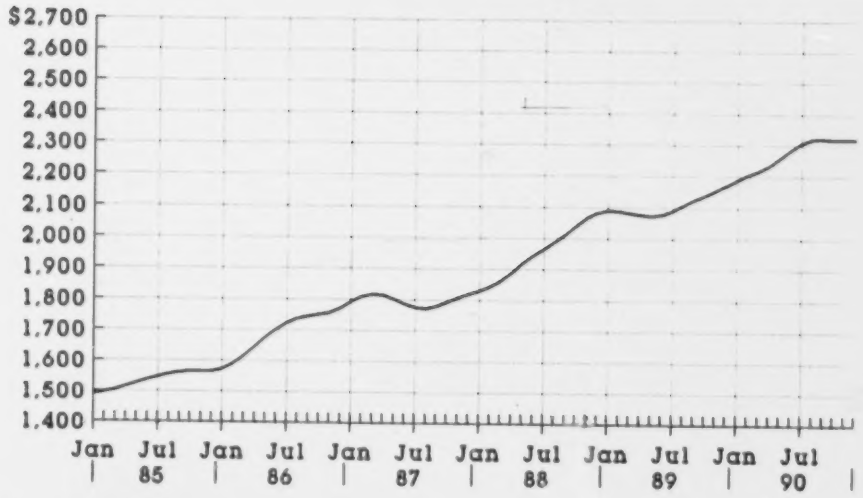
Trend: Moving steadily upward with periodic plateaus of about 4 months duration.

Cycle: Generally reflects the business cycle.

Comments: Hygienist salary and wages are closely related to utilization of their services during the current month. Since total visits including hygienist visits have increased only about ten percent over the entire time period, growth is primarily inflation-driven.

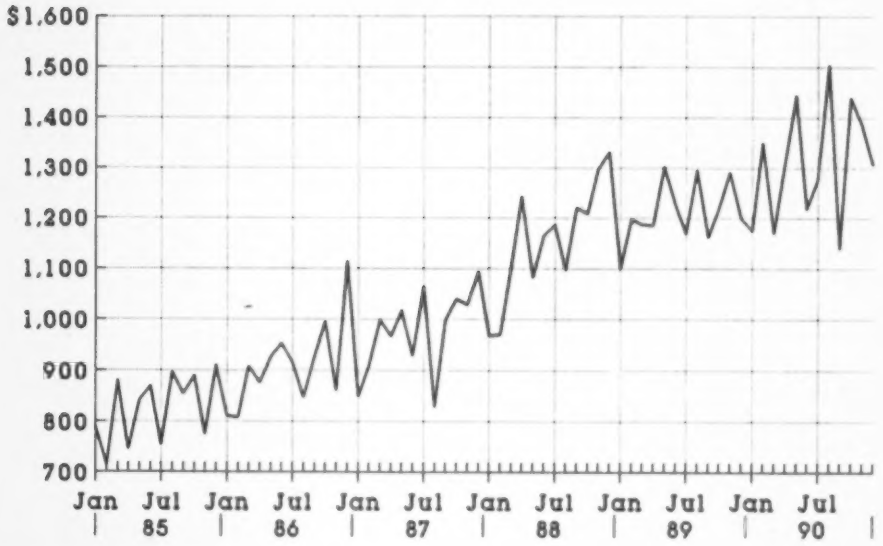
The Average Monthly Salary and Wages Paid to Dental Hygienists Does Not Vary Seasonally

Average Monthly Salary and Wages Paid to Dental Hygienists (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Expenditure for Dental Supplies



Source: ADA, Quarterly Survey of Dental Practice

Seasonality: Expenditures for dental supplies do not vary seasonally and show very little month-to-month variation. Average expenditures are only slightly higher in December and slightly lower in January.

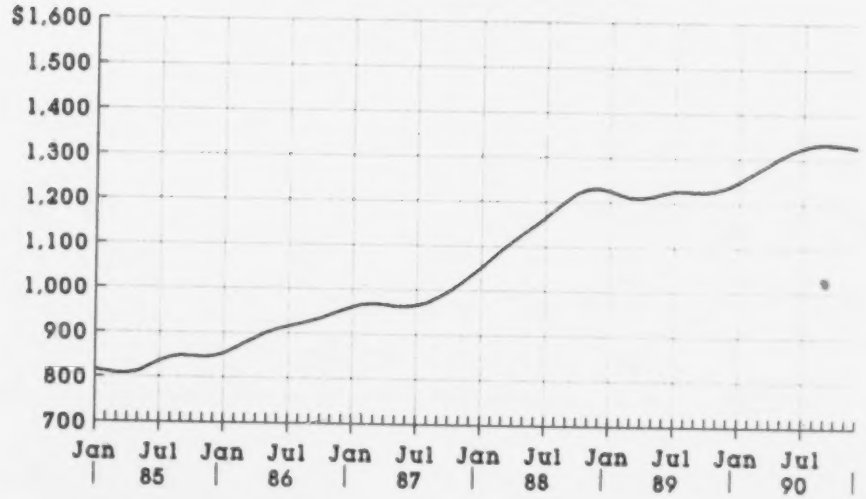
Trend: Steady upward movement that has slowed since February 1989.

Cycle: Growth reflects the business cycle.

Comments: Dental supply expenditures are only slightly related to both patient visits measures. As such, growth is probably the result of inflation.

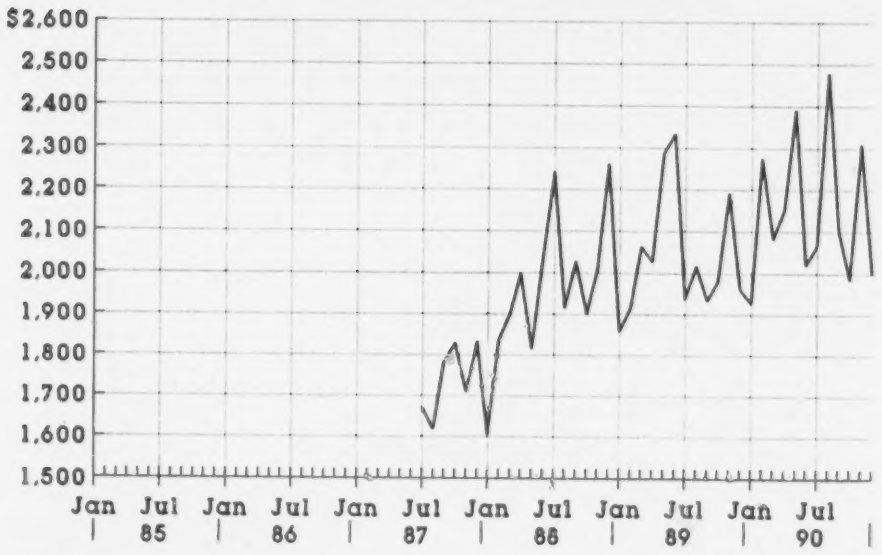
The Average Monthly Expenditure for Dental Supplies Does Not Vary Seasonally

Average Monthly Expenditure for Dental Supplies (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

Average Monthly Expenditure for Dental Laboratory Services



Source: ADA, Quarterly Survey of Dental Practice

Seasonality: Expenditures for dental lab services are not seasonal. On average, the largest expenditures are made in May, closely followed by June. The smallest expenditure is usually made in January.

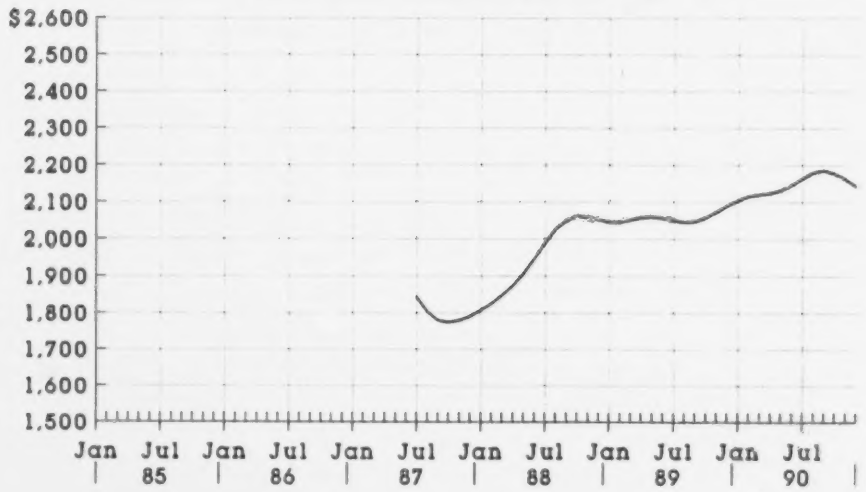
Trend: Slowly upward after a large increase between October 1987 and Septembe 1988.

Cycle: There is not enough data to discern a clear pattern.

Comments: Data collection for dental lab service expenditures began in July 1987. Data collected since then indicate a moderately strong relationship with fees charged by the dentist only but only a weak relationship with visits to the dentist only. Considering this, growth is probably inflation-driven.

The Average Monthly Expenditure for Dental Laboratory Services Does Not Vary Seasonally

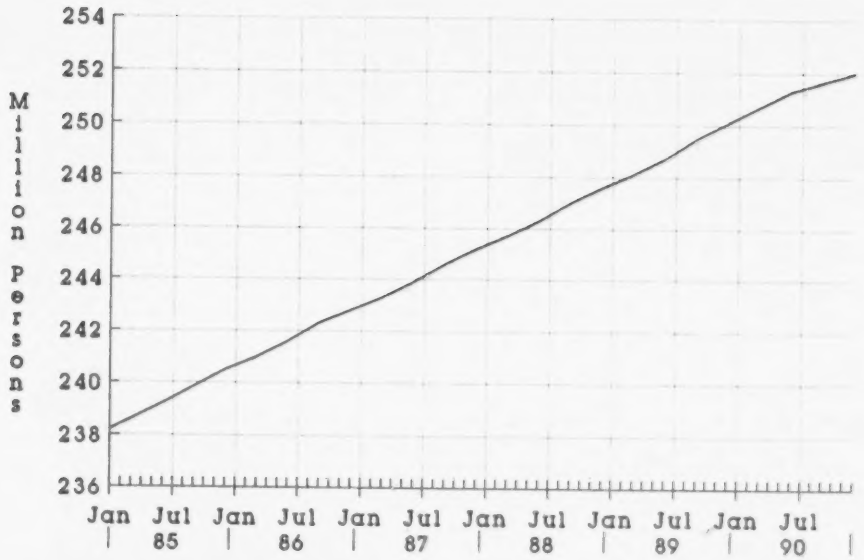
Average Monthly Expenditure for Dental Laboratory Services (Trend-Cycle Component)



Source: ADA, Quarterly Survey of Dental Practice

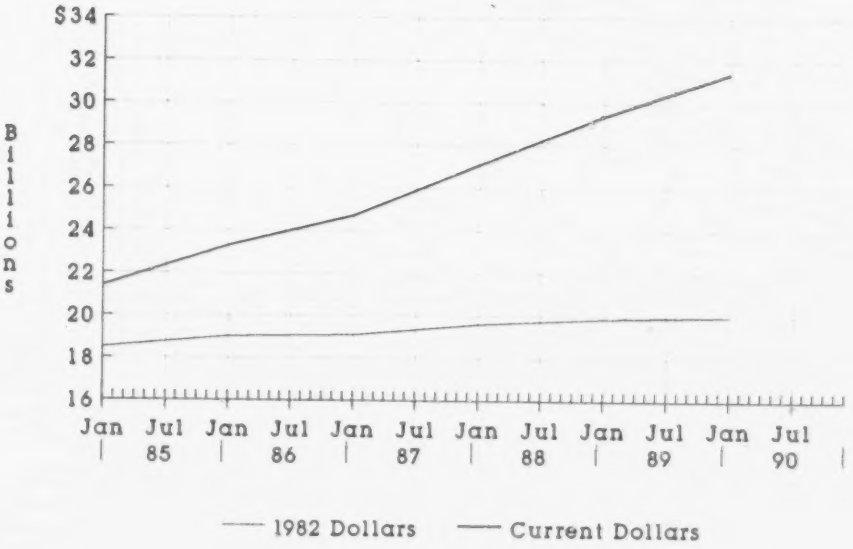
National Economic Indicators

Total Population



Source: US Census Bureau, Series P-25, Numbers 1053 and 1061

Expenditures for Dental Services

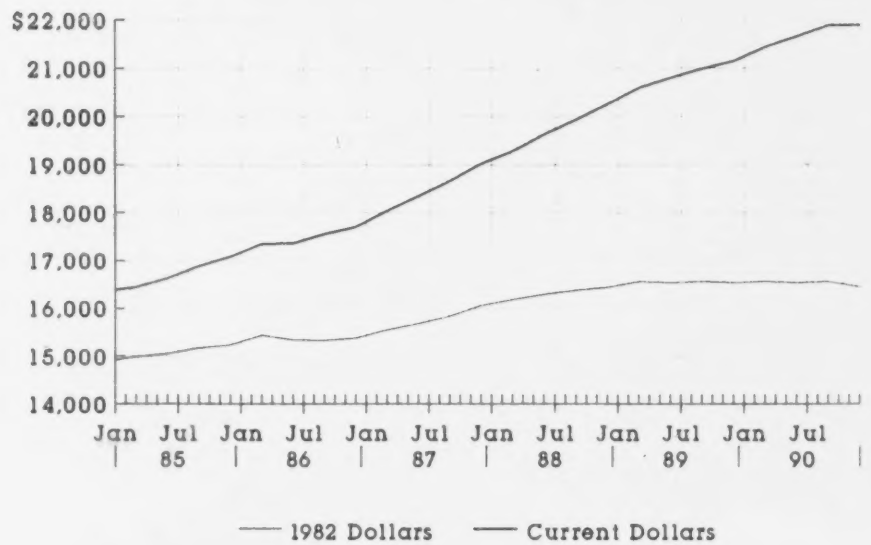


Source: HCFA, Health Care Financing Review, Winter 1990

Gross National Product

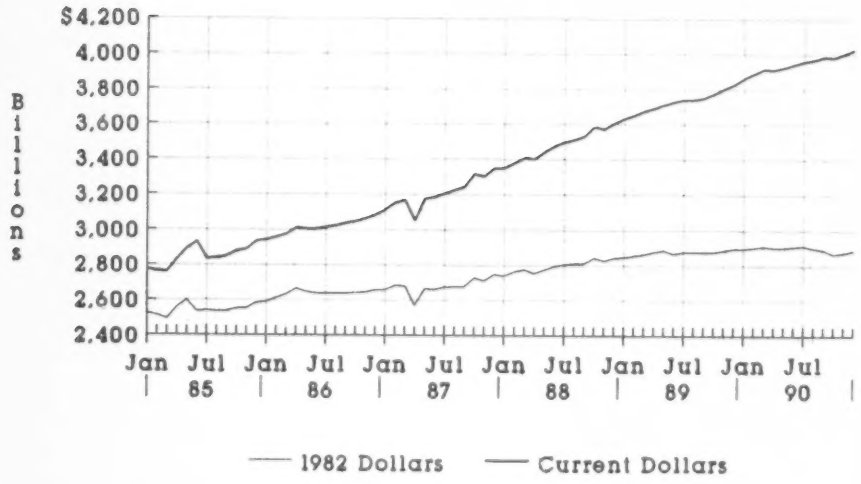
Source: US Dept. of Commerce
Business Conditions Digest &
Survey of Current Business

Per Capita Gross National Product



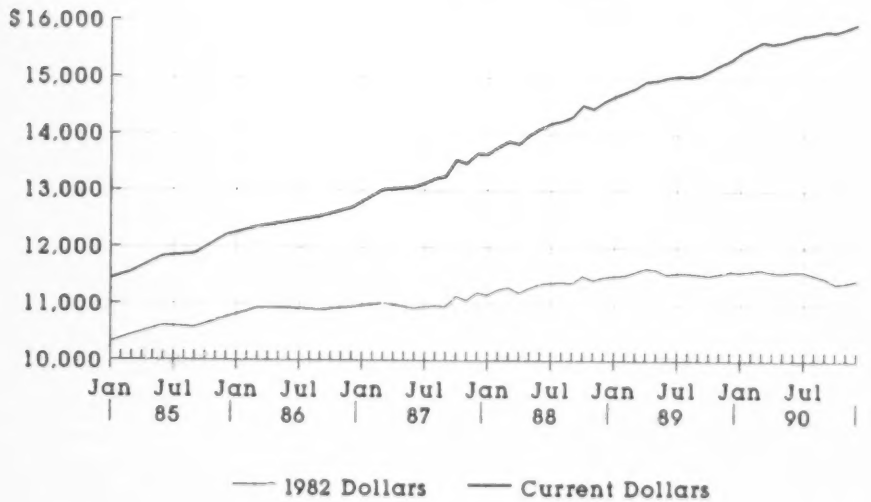
Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Disposable Income
(Seasonally Adjusted)



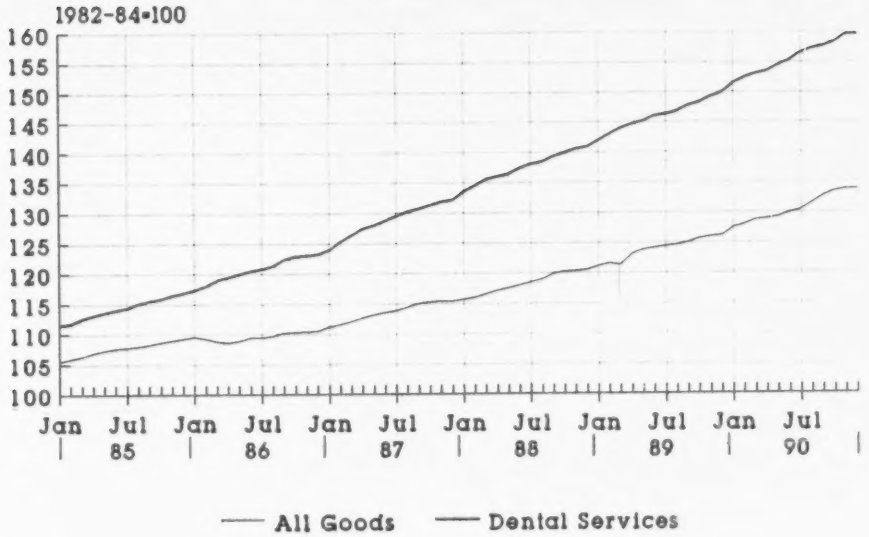
Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Per Capita Disposable Income
(Seasonally Adjusted)



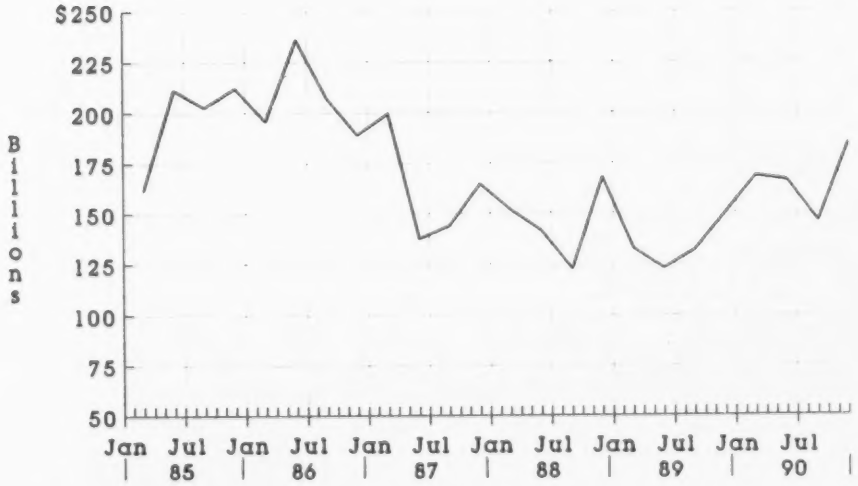
Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Consumer Price Indices



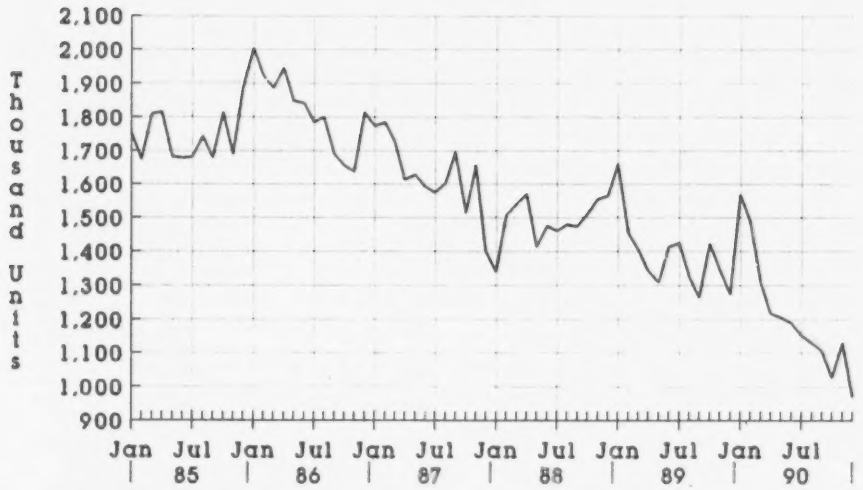
Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Federal Deficit
(Quarterly Data)



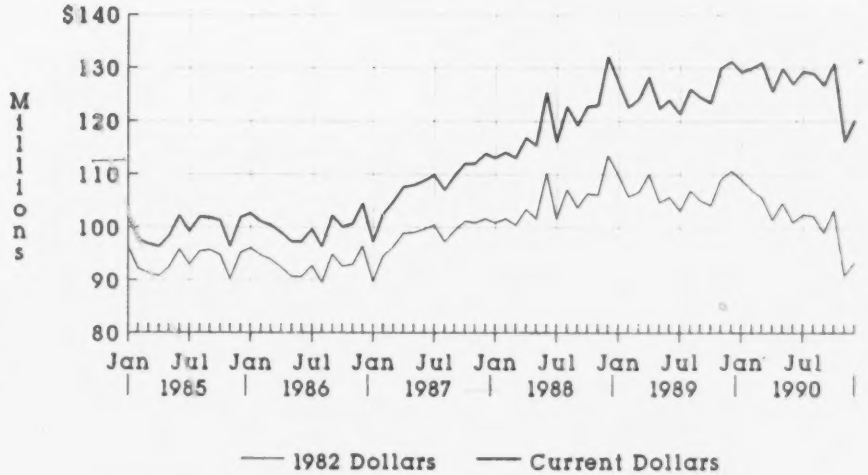
Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

New Housing Units Started
(Annual Rate)



Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

New Orders for Durable Goods
(Seasonally Adjusted)

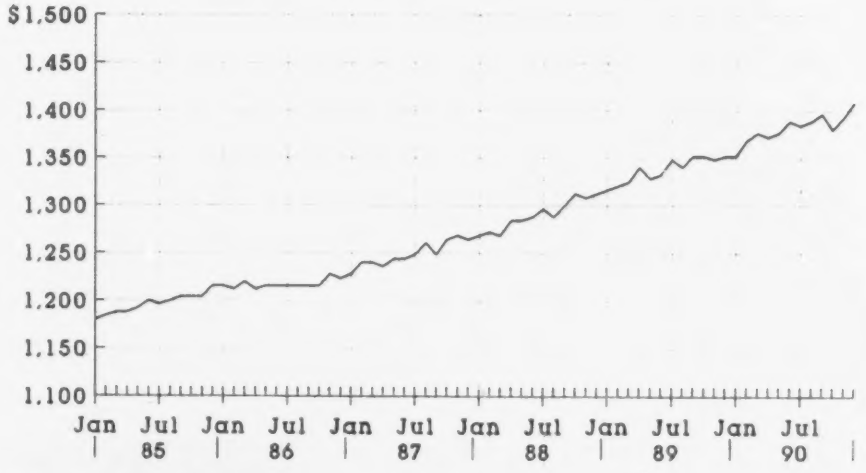


Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Unemployment Rate

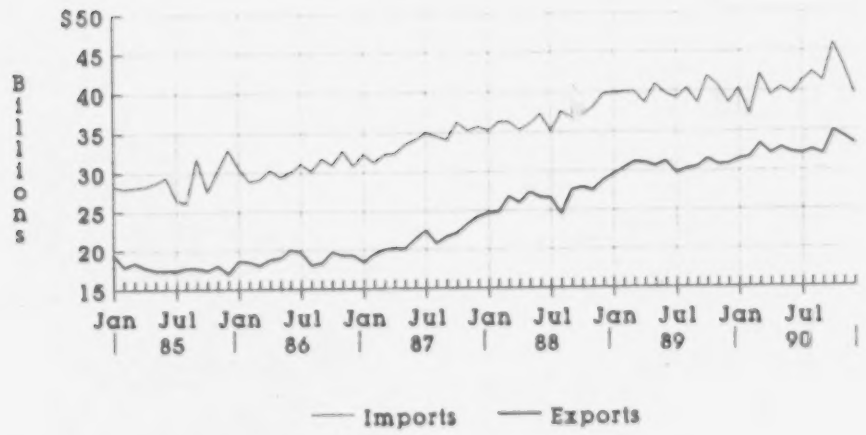
Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Average Monthly Salary Per Worker On Private Non-Agricultural Payrolls (Seasonally Adjusted)



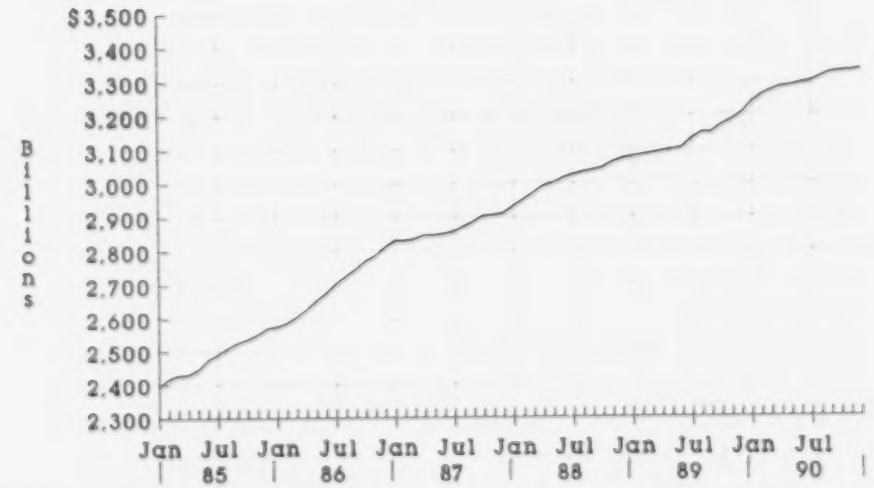
Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Merchandise Imports and Exports, Not Including Military Goods (Seasonally Adjusted)



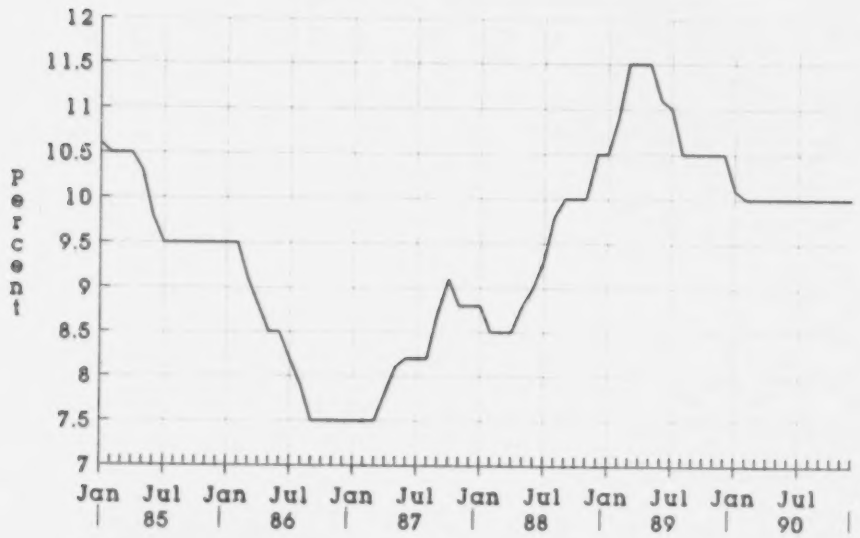
Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Money Supply, M-2 (Seasonally Adjusted)



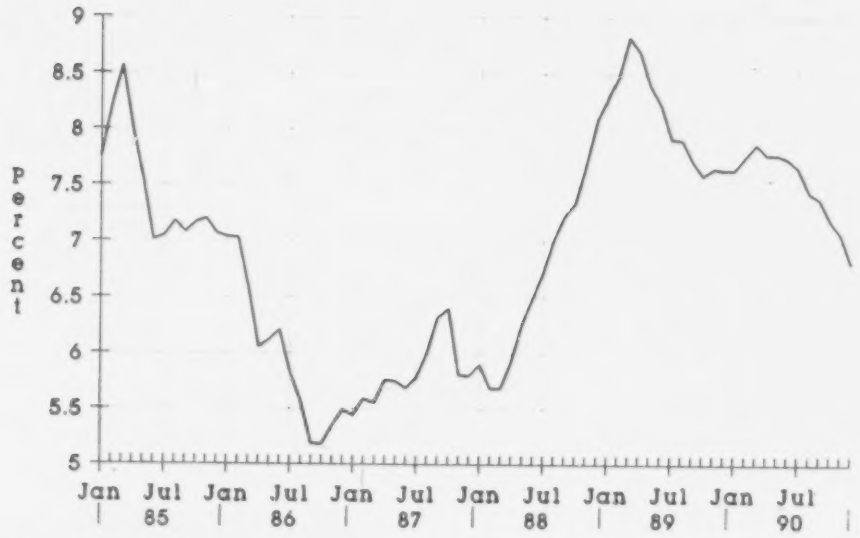
Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Prime Interest Rate



Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business

Discount Rate on 91-Day Treasury Bills



Source: US Dept. of Commerce,
Business Conditions Digest &
Survey of Current Business